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EXAMINER
TORRES, JOSEPH D

ART UNIT	PAPER NUMBER
2133	6

DATE MAILED: 04/10/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/696,666	KAHN ET AL.	
	Examiner	Art Unit	
	Joseph D. Torres	2133	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 January 2002* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-71* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-71* is/are rejected.

7)☒ Claim(s) *1-51* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *25 October 2000* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *4* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Objections

1. Claims 1-51 objected to because of the following informalities: The Examiner assumes "each said storage block**s**" was intended in lines 3 and 5. Appropriate correction is required.

Claim 2-17 depend from claim 18, hence inherit the deficiencies of claim 18.

Claim 18 cites similar language as in claim 1.

Claim 19-34 depend from claim 18, hence inherit the deficiencies of claim 18.

Claim 35 cites similar language as in claim 1.

Claim 36-51 depend from claim 35, hence inherit the deficiencies of claim 35.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 1-17 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 recites the limitation "said data block" in line 7. There is insufficient antecedent basis for this limitation in the claim.

Claims 5-7 cite similar language, i.e., "said data block".

Claims 1-17 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential elements, such omission amounting to a gap between the elements. See MPEP § 2172.01. The omitted elements are: the phrase "wherein said data portion is responsive to data for said data block" make no sense since it is unclear how a data portion is responsive to itself.

The Examiner assume the Applicant intended: wherein said data portion is responsive to **input data for storing the input data in said storage block**. [Emphasis Added]

Claim 9 cites, "said block-appended checksum includes a checksum of said block-appended checksum" and Claim 7 cites, "wherein said checksum is a block-appended checksum". The Examiner asserts that if the block-appended checksum is the checksum for the data then it only contains the checksum for the data and it cannot contain a checksum of said block-appended checksum. Claim 9 does not make sense, hence fails to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The Examiner is not sure what the Applicant intended.

Claim 10 depends from claim 9; hence inherits the deficiencies of claim 9.

Claims 5-7 cite similar language.

Claim 2-17 depend from claim 1, hence inherit the deficiencies of claim1.

3. Claims 26, 27, 43, 44, 60 and 61 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 26 cites substantially the same language as in claim 9 (see rejection to claim 9, above).

Claim 27 depends from claim 26; hence inherits the deficiencies of claim 26.

Claim 43 cites substantially the same language as in claim 9 (see rejection to claim 9, above).

Claim 44 depends from claim 43; hence inherits the deficiencies of claim 43.

Claim 60 cites substantially the same language as in claim 9 (see rejection to claim 9, above).

Claim 61 depends from claim 60; hence inherits the deficiencies of claim 60.

4. Claims 56-61 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 56 and 57 recite the limitation "said reading data" in line 2. There is insufficient antecedent basis for this limitation in the claim. The Examiner asserts, "reading data" in line 4 is an operation of reading data and not a noun, hence cannot provide antecedent basis for "said reading data"

Claims 60 and 61 depend from claim 57; hence inherit the deficiencies of claim 57.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-6, 18-23 and 35-40 are rejected under 35 U.S.C. 102(b) as being anticipated by Dewey, Douglas William et al. (US 5864655 A, hereafter referred to as Dewey).

35 U.S.C. 102(b) rejection of claim 1.

Dewey teaches an apparatus including a mass storage device (Disk Array 304 of Figure 3 of Dewey is a mass storage device), said mass storage device having a plurality of sectors (Note: Webster's dictionary defines a sector as a subdivision of a track on a computer disk, generally a sector is the unit storage element for a magnetic or optical disk), said apparatus including a plurality of storage blocks (Figure 1B and 2A of Dewey teaches a plurality of storage blocks for a RAID level 4 system, Note: the parity grouping consisting of the contiguous data blocks, B1-B20 and Parity blocks P1-P4 are a data error correction storage unit; hence the parity grouping of Figure 1B in Dewey is a storage block, see col. 1, lines 20-41 in Dewey for details), each said storage block including a plurality of said sectors (in col. 1, lines 21-23, Dewey teaches that the data blocks making up the parity group storage block can be sectors but are not limited to being sectors, hence Dewey teaches that each parity group storage block includes a plurality of data block sectors); wherein each said storage block includes a data portion and an error code portion (in Figure 1B, Dewey teaches each said parity group storage blocks includes a data portion, B1-B20, and an error code portion, P1-P4); wherein said

data portion is responsive to input data for storing the input data in said storage block (Figure 1A in Dewey depicts B1-B20 as a data stream and Figure 1B depicts data B1-B20 allocated to the parity group storage block for storage); and wherein said error code portion is responsive to data for a plurality of said sectors in each said storage block (in column 1, lines 34-37, Dewey teaches, the error code portion is calculated from the data portion corresponding to sector data, B1-B20, hence the error code portion is responsive to data for a plurality of said sectors in each said storage block).

35 U.S.C. 102(b) rejection of claim 2.

See col. 2, lines 64-67 in Dewey.

35 U.S.C. 102(b) rejection of claims 3 and 4.

See col. 1, lines 20-21 in Dewey.

35 U.S.C. 102(b) rejection of claim 5.

In Figure 1B in Dewey, parity portion, P1-P4, is appended to the data portion B1-B20 to form a Parity Group storage block.

35 U.S.C. 102(b) rejection of claim 6.

See col. 1, lines 34-37 in Dewey. Note: an exclusive-OR is a checksum operation; Figure 7A teaches the actual checksum operation.

35 U.S.C. 102(b) rejection of claim 18.

Claim 18 substitutes a "first subset" for a "data portion" and a "second subset" for an "error code portion", hence is a generalization of claim 1.

35 U.S.C. 102(b) rejection of claims 19-23.

Claims 19-23 cite substantially the same language as in claims 2-6, respectively.

35 U.S.C. 102(b) rejection of claims 35-40.

Claims 35-40 are method claims for claims 18-23 and cite substantially the same language as in claims 18-23.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

6. Claims 7, 8, 12-17, 24, 25, 29-34, 41, 42 and 46-51 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dewey, Douglas William et al. (US 5864655 A, hereafter referred to as Dewey).

35 U.S.C. 103(a) rejection of claims 7, 24 and 41.

Dewey, substantially teaches the claimed invention described in claims 1-6, 18-23 and 35-40 (as rejected above).

However Dewey, does not explicitly teach the specific use of a specific size for data and parity blocks.

In col. 1, lines 20-23, Dewey explicitly teaches that blocks are a constant size including but not limited to sector size. Furthermore, in col.4, lines 28-32, Dewey states, "it will be understood by those skilled in the art that various changes in form and details may be made therein without departing from the spirit and scope of the invention" in recognition of the fact that one of ordinary skill in the art at the time the invention was made such as an engineer can take the various designs in the Dewey patent and implement the designs in an environment having specific design requirements based on sector size, track size, number of disks, available circuitry, etc. without deviating from the scope or the intent of the teachings in the Dewey patent. One of ordinary skill in the art at the time the invention was made would be highly motivated to implement the designs taught in the Dewey patent to gain the benefits taught in the Dewey patent (see col. 1, lines 11-16, Dewey) in a specific environment for which the teachings of Dewey are explicitly designed for.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the teachings in the Dewey patent by including use of a specific data and checksum block sizes. This modification would have been obvious to one of ordinary skill in the art, at the time the invention was made, because one of ordinary skill in the art would have recognized that use of a specific data and checksum block size would provide the opportunity to implement the design taught in the Dewey patent for a specific environment based on obvious engineering design requirements such as sector size, track size, number of disks, available circuitry, etc.

35 U.S.C. 103(a) rejection of claims 8, 25 and 42.

In Figure 1B in Dewey, parity portion, P1-P4, is appended to the data portion B1-B20 to form a Parity Group storage block. See col. 1, lines 34-37. Note: an exclusive-OR is a checksum operation; hence the block-appended parity is a block-appended checksum.

35 U.S.C. 103(a) rejection of claims 12-17, 29-34 and 46-51.

One of ordinary skill in the art at the time the invention was made such as an engineer would have been able to take the various designs in the Dewey patent and implement the designs in an environment having specific design requirements based on sector size, track size, number of disks, available circuitry, etc. without deviating from the scope or the intent of the teachings in the Dewey patent (see rejection to claim 7, above).

7. Claims 11, 28 and 45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dewey, Douglas William et al. (US 5864655 A, hereafter referred to as Dewey) in view of Suganuma, Tomoyuki et al. (US 5666511 A, hereafter referred to as Suganuma).

35 U.S.C. 103(a) rejection of claims 11, 28 and 45.

Dewey, substantially teaches the claimed invention described in claims 1-8, 18-25 and 35-42 (as rejected above).

However Dewey, does not explicitly teach the specific use of cache or RAM.

Suganuma, in an analogous art, teaches use of Cache memory (see Cache memory 26 in Figure 11). Suganuma teaches that the cache memory is a component of the RAID controller (col. 11, lines 56-67 in Suganuma) required for operation of a RAID device. In col. 1, lines 45-63, Dewey does not teach the particulars of a RAID controller, however explicitly teaches that a RAID controller is required for operation of a RAID device. The Examiner asserts that use of the particulars of the RAID controller taught in Suganuma would make the required RAID controller of Dewey operational, hence one of ordinary skill in the art at the time the invention was made would be highly motivated to combine Dewey with Suganuma in order to use the device of Dewey.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Dewey with the teachings of Suganuma by including use of the controller taught in the Suganuma patent (Note: the controller in Suganuma includes Cache memory). This modification would have been obvious to one of

ordinary skill in the art, at the time the invention was made, because one of ordinary skill in the art would have recognized that use of the controller taught in the Suganuma patent would provide the opportunity to implement the design in the Dewey patent by making it operational and to gain the benefits of the teachings in the Dewey patent such as improved data integrity (see col. 1, lines 11-16, Dewey).

8. Claims 52-59 and 62-71 are rejected under 35 U.S.C. 103(a) as being unpatentable over Baba, Hiroshi et al. (US 5758057 A, hereafter referred to as Baba) in view of Dewey, Douglas William et al. (US 5864655 A, hereafter referred to as Dewey).

35 U.S.C. 103(a) rejection of claim 52.

Baba teaches method for efficiently detecting data errors in a mass storage system (the apparatus of Figure 6 in Baba provides a method for detecting errors in the mass storage device of Figure 5 in Baba), said mass storage system having a plurality of storage blocks composed of a collection of sectors (in Figures 5 and 17 of Baba, Baba teaches that a storage block consists of data units D0, D1...Dn; since a sector is a unit of disk storage and each of the Dk is stored at the same addresses on different disks, the data D0, D1...Dn is stored in a collection of sectors with the same address), including reading data and error code information located in said storage blocks in a single operation (Figure 6 of Baba teaches 5 parallel channels for reading a single storage block of data and error code information in a single operation); calculating run-time error code information for said data located in storage blocks (the XOR

operation, D0 XOR D1 XOR D2 XOR D3, in Figure 6 is a calculation to produce a run-time error code information for said data located in storage blocks, D0, D1, D2, D3); and comparing said error code information with said run-time error code information (the XOR of parity p with the run-time error code information, D0 XOR D1 XOR D2 XOR D3, is a step for comparing since comparison is equivalent to XOR in binary logic). However Baba, does not explicitly teach that storage blocks are composed of a collection of sectors.

Dewey, in an analogous art, teaches storage blocks composed of a collection of sectors (in col. 1, lines 21-23, Dewey teaches the data blocks that make up the parity grouping storage block can be sectors but are not limited to being sectors, hence Dewey teaches that each parity group storage block includes a plurality of data block sectors). The Examiner asserts that Baba does not explicitly teach a particular size for each of the data block D0, D1... making up unit storage block but leaves the decision of size up to an engineer in the design phase of the system based on the environment, i.e., specific design requirements based on sector size, track size, number of disks, available circuitry, etc.. One would be highly motivated to choose a sector as the size for the data units D0, D1... since a sector is the unit storage element on a disk.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Baba with the teachings of Dewey by including use of storage blocks composed of a collection of sectors. This modification would have been obvious to one of ordinary skill in the art, at the time the invention was made, because one of ordinary skill in the art would have recognized that storage blocks composed of a

collection of sectors would have provided the opportunity to ensure that data units are consistent with sector storage units on a disk.

35 U.S.C. 103(a) rejection of claim 53.

See col. 2, lines 64-67 in Dewey.

35 U.S.C. 103(a) rejection of claims 54 and 55.

See col. 1, lines 20-21 in Dewey.

35 U.S.C. 103(a) rejection of claims 56.

In Figure 5 in Baba, parity portion, P, is appended to the data portion D0-D3 to form a Parity Group storage block.

35 U.S.C. 103(a) rejection of claim 57.

See col. 1, lines 34-37 in Dewey. Note: an exclusive-OR is a checksum operation; Figure 7A teaches the actual checksum operation.

35 U.S.C. 103(a) rejection of claim 58 and 63-68.

One of ordinary skill in the art at the time the invention was made such as an engineer would have been able to take the various designs in the Baba and Dewey patents, and implement the designs in an environment having specific design requirements based on sector size, track size, number of disks, available circuitry, etc. without deviating from

the scope or the intent of the teachings in the Baba and Dewey patents (see rejection to claim 52, above).

35 U.S.C. 103(a) rejection of claims 59.

In Figure 5 in Baba, parity portion, P, is appended to the data portion D0-D3 to form a Parity Group storage block.

35 U.S.C. 103(a) rejection of claim 62.

See Buffer 105 in Figure 5 of Baba.

35 U.S.C. 103(a) rejection of claim 69.

If a binary one results from the XOR calculation in Figure 6 of Baba then the run-time error information is not equivalent to the error information parity P.

35 U.S.C. 103(a) rejection of claim 70.

In col. 4, lines 26-34 and Figure 4, Baba teaches that errors are detected and logged and used to provide an indication of faults (see step S17 in Figure 4 of Baba).

35 U.S.C. 103(a) rejection of claim 71.

In the Abstract, Baba teaches that the mass storage device continues to transmit data in the event that data is recoverable (Note: data that is error-free is recoverable as well as correctable data).

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Matsunami, Naoto et al. (US 6006308 A) teaches a library storage system is implemented to comprise a redundant array of inexpensive libraries (RAIL).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joseph D. Torres whose telephone number is (703) 308-7066. The examiner can normally be reached on M-F 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Albert Decady can be reached on (703) 305-9595. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 746-7239 for regular communications and (703) 746-7238 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)-746-7240.

Joseph D. Torres, PhD
Art Unit 2133
April 4, 2003